Service Manual

MODEL

BP-110

SPECIFICATIONS

Frequency Range
MW 520-1650kHz
Intermediate Frequency..455kHz
Power Supply .....DC 3V(UM-3x2)
Power Output
Undistorted 100mW
Maximum 150mW
Speaker .....5cm (2″) p.d.s. 8 ohm I.
Dimensions .....6.4cm (2 1/2″) (W) ×
10.8cm (4 1/4″) (H) ×
2.45cm (1″) (D)
Weight .....130gr. (without batteries)
Transistor Complement
Q1 2SA354(B) .....Converter
Q2 2SA353(C) .....1st IF Amplifier
Q3 2SA12(C) .....2nd IF Amplifier
Q4 2SB77(D) .....Audio Amplifier
Q5, Q6 2SB77(C) .....Output (Matched pair)

GENERAL DESCRIPTION

The circuit used in this 1 band portable radio incorporates 6 transistors, 1 diode. A ferrite bar antenna feeds the AM signal to the AM converter, two IF amplifiers a diode detector.
Audio signal passes through the 3 transistor audio amplifier circuit. An AM AVC voltage is fed back to the 1st IF amplifier.

CHASSIS REMOVAL

1. Remove the battery cover and take out the batteries.
2. Remove the bottom of the back cover.
3. Remove the 2 screws retaining the printed circuit board.
4. Carefully draw out the printed circuit board to your side and then remove it from the cabinet.

HAYAKAWA ELECTRIC CO., LTD.
OSAKA, JAPAN

ALIGNMENT INSTRUCTIONS

Should it become necessary at any time to check the alignment of this receiver, proceed as follows;

1) Connect an output meter across the speaker voice coil lugs.
2) Set volume control for maximum.
3) Attenuate the signals from the generator enough to swing the most sensitive range of output meter.
4) Use a non-metallic alignment tool.
5) Repeat adjustment to insure good results.

AM ALIGNMENT CHART

Signal generator			Receiver		Adjust
Step	Connection to receiver	Input signal frequency	Dial setting	Remarks	
1	Connect signal generator through 10KΩ resistor to the antenna tuning condenser. Ground lead to the receiver ext. earth.	Exactly 455kHz. (1000Hz, 30%, AM modulated)	Tuning gang fully open. (minimum capacity)	Adjust for maximum output on speaker voice coil lugs.	T-3 T-2 T-1
2	Use radiating loop. Loop of several turns of wire, or place generator lead close to receiver for adequate signal pickup. Connect generator output to one end of this wire.	Exactly 600kHz. (1000Hz, 30%, AM modulated)	600kHz	Same as step 1.	L2 L1 (See Note)
3	Same as step 2.	Exactly 1200kHz. (1000Hz, 30%, AM modulated)	1200kHz	Same as step 1.	C4 C3 (See Note)
4	Repeat steps 2 and 3 until no further improvement is obtained.				

NOTE:
Check alignment of receiver antenna coil by bringing a piece of ferrite (such as a coil slug) near the antenna loop stick, then a piece of brass. If ferrite increases output, loop requires more inductance. If brass increases output, loop requires less inductance, change loop inductance by sliding the bobbin toward the center of ferrite core to increase inductance, or away to decrease inductance.

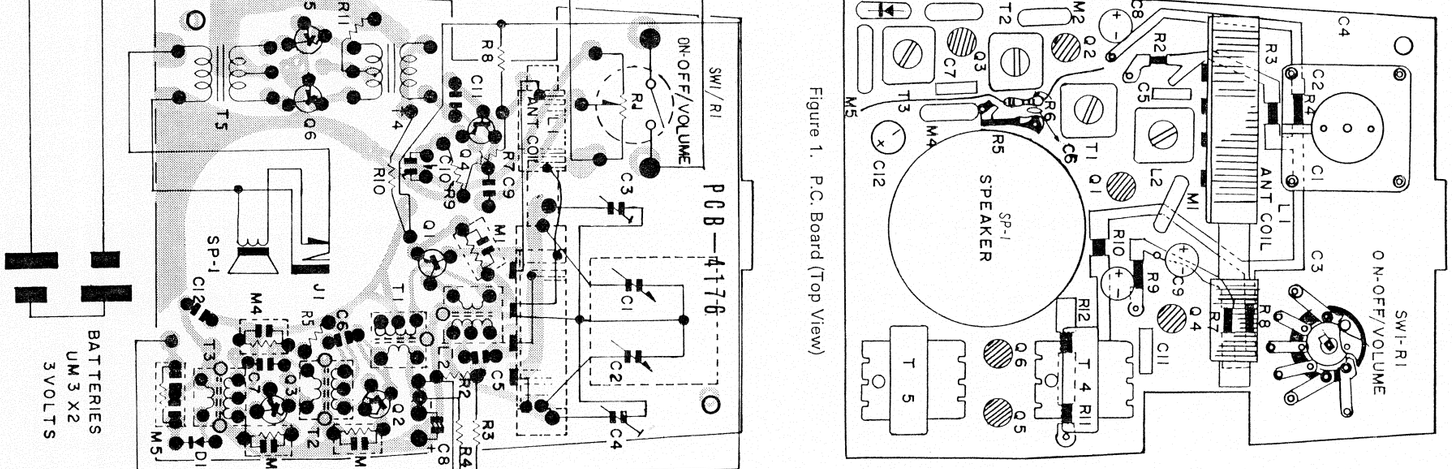
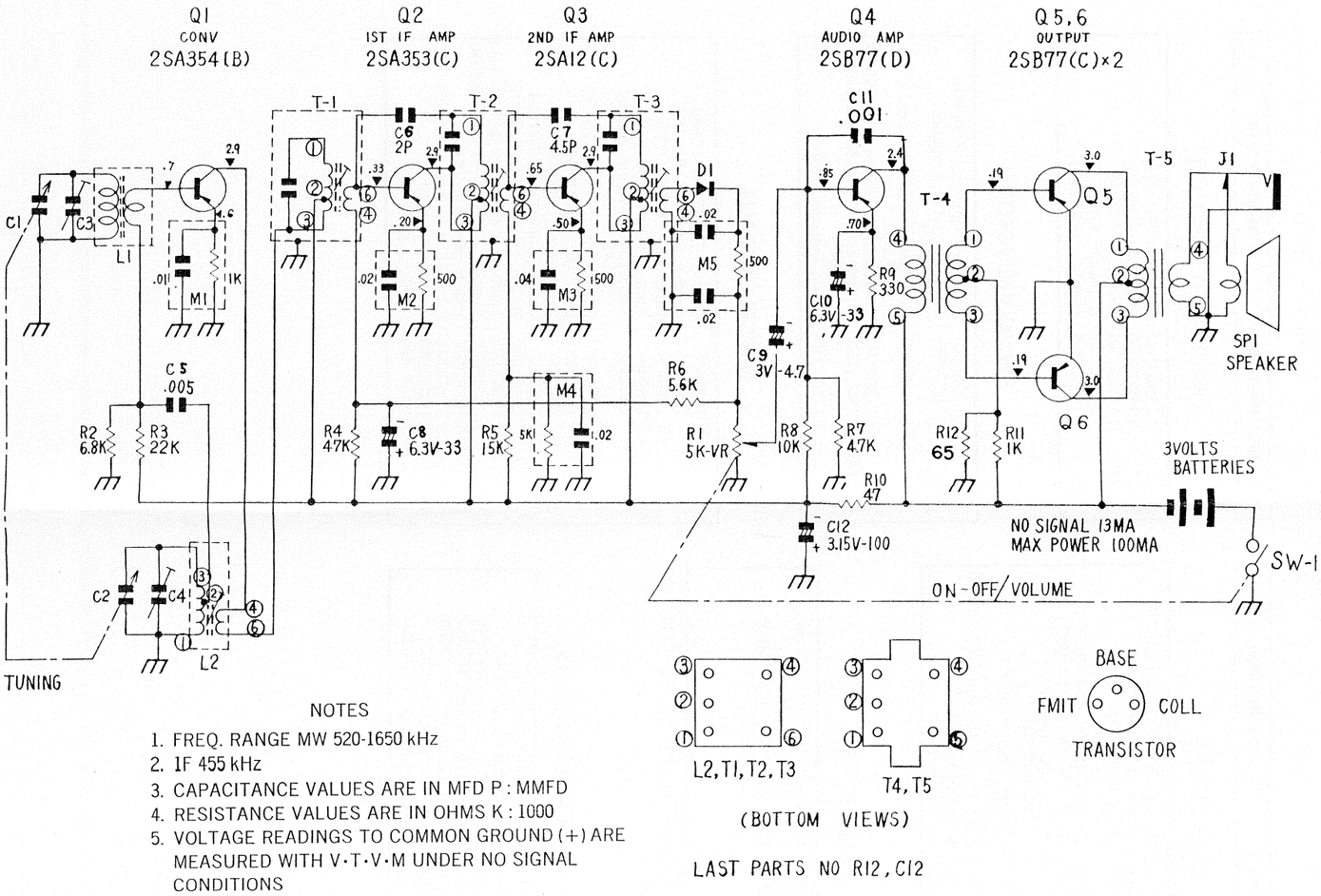


Figure 1. P.C. Board (Top View)

Figure 2. P.C. Board (Bottom View)



NOTES

1. FREQ. RANGE MW 520-1650 kHz
2. IF 455 kHz
3. CAPACITANCE VALUES ARE IN MFD P : MMFD
4. RESISTANCE VALUES ARE IN OHMS K : 1000
5. VOLTAGE READINGS TO COMMON GROUND (+) ARE MEASURED WITH V·T·V·M UNDER NO SIGNAL CONDITIONS

Figure 3. Schematic Diagram

PARTS LIST

CAPACITORS

REF. NO.	PART NO.	DESCRIPTION
C1, C2	1560241400	Variable Tuning Gang (VC-414)
C3, C4	1560270800	Trimmer (TO-708)
C5	1556250637	.005 mfd, 50V, 20%, Mylar (ML-5-506M)
C6	1552220917	2 pf, 50V, Discap (D-5-209C)
C7	1552245927	4.5 pf, 50V, Discap (D-5-459D)
C8, C10	1661233211	33 mfd, 6.3V, Electrolytic (CU-06-332Q)
C9	1661247322	4.7 mfd, 10V, Electrolytic (CU-1-473R)
C11	1568290700	.001 mfd, 50V, 20% Discap (D-5-106M)
C12	1661210111	100 mfd, 6V, Electrolytic (CU-06-101Q)

RESISTORS

R1	1548272800	5 K ohm, Pot., On-Off/Volume Control (8V-728)
R6	1544256229	5.6 K ohm, 1/8W, 10%, Carbon (1/8 SA-5,6KK)

Unless otherwise specified resistors ((R2~R5 & R7~R12) are printed circuit Resistor.

COILS AND TRANSFORMERS

L1	1508221300	Coil, Antenna (8L-213A)
L2	1570203000	Coil, Oscillation (7L-030B)
T1	1570274788	Transformer, 1st IF (7IF-747P)
T2	1570274688	Transformer, 2nd IF (7IF-746P)
T3	1570271888	Transformer, 3rd IF (7IF-718P)
T4	1513280300	Transformer, Input (6T-803)
T5	1517282200	Transformer. Output (7T-822)

REF. NO.	PART NO.	DESCRIPTION

PACKAGED CIRCUITS

M1	1559231900	Capristor (PRC-319)
M2	1559233100	Capristor (PRC-331)
M3	1559230700	Capristor (PRC-307)
M4	1559231500	Capristor (PRC-315)
M5	1559230300	Capristor (PRC-303)

SEMICONDUCTORS

Q1	1527213721	Transistor, Converter (2SA354)
Q2	1527213831	Transistor, 1st IF Amplifier (2SA353)
Q3	1522210131	Transistor, 2nd IF Amplifier (2SA12)
Q4	1522211341	Transistor, Audio Amplifier (2SB77)
Q5, Q6	1522211338	Transistor, Output (Matched pair) (2SB77)
D1	1527271601	Diode, Detector (1S80)

MISCELLANEOUS

	11032346	Cabinet, Top (3CAB-4176A)
	11034346	Cabinet, Back (3CAB-4176B)
	11062830	Panel, Dial (PANEL-4176)
	11092414	Knob, Tuning (9K-414)
	11092415	Knob, On-Off/Volume control (9K-415)
	11302903	Cabinet, Front (PUNCH-4176)
	11512722	Leath (LEATH-4176)
	11932877	Belt, Carring (BELT-4176)
	11932251	Cover, Battery (B-BUTA4176)
	1393279000	Holder, Battery (B-HOLD4176)
	1393283956	Terminal, Battery (+) (B-TANSI-A)
	1393284056	Terminal, Battery (−) (B-TANSI-B)
	1530210856	Jack Earphone (J-108)
	1546270400	Printed Circuit Board (PRCB-4176)
	1507220900	Speaker (5P-41H)
	1593240200	Earphone (3MR-402)

Printed in Japan